REMARKS

This Amendment is responsive to the final Office Action mailed on September 17, 2008 and the Advisory Action mailed on November 26, 2008. Claims 1-4, 6-12, 14-17, and 19-26 are pending. Claims 1, 11, 14-16, 19, and 21 have been amended. In view of the foregoing amendments and the following remarks, Applicant respectfully submits that the application is in complete condition for allowance and requests reconsideration in this regard.

Claim Rejection under 35 U.S.C. § 112, second paragraph

The Examiner rejected claim 21-23 under 35 U.S.C. § 112, second paragraph. The Examiner contends that claim 21 "reffer *(sic)* to 'the device' as the device in which is dispense the viscous material to a surface of a substrate". As this statement is best understood by Applicants' representative, Applicants note that claim 21 does not state that the viscous material is dispensed from the claimed "device". Instead, the "device" is positioned on the surface of the substrate and, as further set forth in claim 21, the droplet is deposited on the surface at a location spaced from the sidewall of the device. Claim 22 further sets forth that the device positioned on the substrate is also "attached to the substrate by solder pads or balls that create a gap between the device and the substrate". Applicants submit that these claims are not indefinite. Applicants request reconsideration of the rejection under § 112, second paragraph.

Applicants appreciate the Examiner's indication in the November 26, 2008 Advisory Action that this rejection has been withdrawn.

Rejection under 35 U.S.C. § 103(a)

The Examiner rejected claim 1 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,565,241 to Mathias et al. ("Mathias") in view of U.S. Patent No. 6,253,957 to Messerly et al. ("Messerly"). According to the Examiner, the primary reference Mathias teaches dispensing viscous material onto a substrate in a nonperpendicular direction because the viscous material is sprayed onto the substrate. The Examiner concludes "at least some droplets travel nonperpendicular with respect to the substrate". Office Action mailed September 17, 2008, p. 3. However, the Examiner acknowledges that Mathias "does not teach [a] droplet made by valve seat and valve elements". Id. The Examiner then invokes Messerly as a secondary reference and concludes that "[i]t would have been obvious to one of ordinary skill of the art at the time of the invention to have used the valve of [Messerly] to apply the droplets of applicant because

[Messerly] teaches that it is a suitable apparatus for droplet application". Id. Applicants respectfully disagree with the rejection.

Mathias discloses a spray device that emits a continuous stream of a liquid resin from a liquid orifice 7. The Examiner points to Figure 2 and column 3, lines 38-42, for the disclosure of the dispensed material forming a droplet. However, the text referenced by the Examiner merely indicates that droplets are formed after the liquid resin is dispensed from the liquid orifice 7 and is atomized by air directed from a set of atomizing holes 6. Figure 2 illustrates that pressurized air streams from the atomizing holes 6 converge with and atomize the dispensed continuous stream of material at a point spaced away from the liquid orifice 7. The result is a fan-shaped flow of liquid resin "having an essentially elliptical circumference so that it can be sprayed onto a designated area of the substrate." *See* col. 3, lines 64-66 of Mathias.

Messerly discloses a jetting dispenser 10' for dispensing minute droplets of viscous material on a substrate. The minute droplets are formed by a valve element 42' moving toward and impacting a valve seat 38' to force an amount of the viscous material through a nozzle 40'. The jetting dispenser in Messerly is typical of the prior art dispensers discussed by Applicants in paragraph [0003] of the application. In particular, as discussed by Applicants and as shown in Figure 1 of Messerly, the jetting dispenser is oriented substantially perpendicular to the surface of the substrate.

In determining the differences between the prior art and the claims, the question under 35 U.S.C. § 103 is not whether the differences themselves would have been obvious, but whether the claimed invention as a whole would have been obvious. The Examiner has instead attempted to improperly combine Messerly and Mathias and has also attempted to improperly modify Mathias based upon the teachings in Messerly in a manner that ignores the claimed invention as a whole.

A person of ordinary skill in the art would not have modified Mathias in view of the teachings of Messerly as suggested by the Examiner. As mentioned above, the Examiner concludes that "at least some droplets travel nonperpendicular with respect to the substrate". Accepting this statement as true, then the Examiner has identified a nonperpendicular jetting direction for a series of droplets in the atomized fan spray. For purposes of argument, Applicants will assume that the random nature of atomization permits this conclusion to be valid. Modifying Mathias to jet a series of droplets, instead of a continuous stream, directly from the

orifice 7 in a jetting direction perpendicular to the substrate would eliminate the need for atomization by the air from the atomizing holes 6. In other words, the atomization would be redundant as the material would already be emitted from the orifice 7 as droplets. In the absence of atomizing air, then the droplets emitted from orifice 7 would not form a fan spray. Hence, the principle of operation of Mathias would be changed by the Examiner's suggested modification from dispensing a continuous stream that is atomized to generate a fan spray with some droplets randomly aligned in a jetting direction to intentionally jetting only a discrete line of droplets jetted by momentum in a jetting direction. Were the atomizing air present, then the droplets would themselves be dispersed in some unknown manner, but no longer as a fan spray. As mentioned in the Background section of Mathias, the use of a fan spray is essential to ensure "accuracy and control requirements". *See* col. 1, lines 18-20. Eliminating the fan spray in Mathias, and thereby changing its principle of operation, would defeat this purpose. If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention (Mathias) being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious. *See* MPEP § 2143.02. Therefore, Applicants submit that the Examiner has failed to establish a *prima facie* case of obviousness with respect to independent claim 1. Accordingly, Applicants request that the rejection of independent claim 1 be withdrawn.

According to examination guidelines, "knowledge of applicant's disclosure must be put aside in reaching this determination, yet kept in mind in order to determine the 'differences,' conduct the search and evaluate the 'subject matter as a whole' of the invention." *See* MPEP § 2142. In this instance, the Examiner's legal conclusion of *prima facie* obviousness has not been reached "on the basis of the facts gleaned from the prior art". *Id.* Instead, the Examiner has engaged in impermissible hindsight based upon disclosure found in Applicants' own specification, which teaches orienting the jetting valve to provide a jetting direction nonperpendicular to the surface of the substrate and then jetting droplets out of the dispensing orifice in the jetting direction. The Examiner's line of reasoning takes into account knowledge that was not within the level of ordinary skill in the art at the time the claimed invention was made and includes knowledge gleaned only from Appellants' specification. Therefore, for this additional reason, Applicants respectfully request that the rejection be withdrawn.

To support the rejection based on Mathias and Messerly, the Examiner states: "It would have been obvious to one of ordinary skill in the art at the time of the invention to have used the valve of [Messerly] to apply the droplets of applicant because [Messerly] teaches that it is a suitable apparatus for droplet application." Office Action mailed September 17, 2008, p. 5. The Examiner's reliance on Messerly is based upon circular logic and, in any event, fails to offer an objective line of reasoning that Mathias could be modified, based upon the teachings in Messerly, from the use of a spray containing droplets to the use of a line of droplets. There is no intrinsic or extrinsic evidence that Mathias could be successfully modified per the teachings in Messerly with a reasonable expectation of success to yield a predictable result. Applicants therefore respectfully request that the Examiner withdraw the rejection.

Rejections under 35 U.S.C. § 103(a)

The Examiner rejected claims 1-12, 14-17, and 19-20 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,447,847 to Hynes et al. ("Hynes") in view of U.S. Patent No. 5,294,459 Hogan et al. ("Hogan"), and further in view of Messerly. The Examiner points to Hynes for the disclosure of a valve having a nozzle for directing material flow in a nonperpendicular direction to the surface of a substrate. Office Action mailed September 17, 2008, p. 4. However, the Examiner acknowledges that Hynes does not disclose the material being viscous and relies upon Hogan for this teaching. The Examiner also acknowledges that neither Hynes nor Hogan discloses droplets made by a valve seat and a valve element and relies on Messerly for the teaching of this aspect. *Id.* at p. 5. Applicants respectfully traverse the Examiner's rejection.

Hynes relates to a spray dispenser used for conformal coating operations. In contrast to Hynes, Messerly is typical of conventional jetting dispensers used in an underfill process. As discussed above, the jetting dispenser 10' of Messerly includes a valve element 42' that impacts a valve seat 38' to eject a droplet of viscous material from a nozzle 40'. The jetting dispenser is oriented substantially perpendicular to the surface of the substrate to facilitate accurate placement of the droplets. Hogan discloses a spray coating device and is merely relied upon by the Examiner for the disclosure of a viscous material. Applicants submit that the dispensing techniques in Hogan are no more relevant than those disclosed in Messerly and Hynes.

In determining the differences between the prior art and the claims, the question under 35 U.S.C. § 103 is not whether the differences themselves would have been obvious, but whether

the claimed invention as a whole would have been obvious. The Examiner has instead attempted to improperly combine Hynes and Mathias and to improperly modify Hynes based upon the teachings in Messerly in a manner that ignores the claimed invention as a whole.

A person of ordinary skill in the art would not have modified Hynes in view of the teachings of Messerly as suggested by the Examiner. Similar to the attempt to modify Mathias based upon Messerly and as discussed above, the Examiner is attempting to modify Hynes to jet a series of droplets, instead of a spray, which would eliminate the need for atomization to form the spray. In other words, atomization to form droplets would be redundant as the material would already be emitted as droplets. In the absence of atomizing air, then the discrete droplets would not form a fan spray. Hence, the principle of operation of Hynes would be changed by the Examiner's suggested modification from dispensing a fan spray with some droplets randomly aligned in a jetting direction to intentionally jetting only a discrete line of droplets jetted by momentum in a jetting direction. Were the atomizing air present, then the droplets would themselves be dispersed in some unknown manner, but no longer as a fan spray. If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention (Hynes) being modified, then the teachings of the references are not sufficient to render the claims prima facie obvious. *See* MPEP § 2143.02. Therefore, Applicants submit that the Examiner has failed to establish a *prima facie* case of obviousness with respect to independent claim 1. Accordingly, Applicants request that the rejection of claim 1 be withdrawn.

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Because claims 2-4, 6-10, and 21-23 depend from independent claim 1, Applicants submit that these claims are also patentable for at least the same reasons discussed in Applicants' preceding remarks. Furthermore, each of these claims recites a unique combination of elements not disclosed or suggested by the combination of Hynes, Hogan, and Messerly. The remaining claims subject to this rejection (claims 11-12, 14-17, 19, 20, and 24-26) include recitations substantially similar to those discussed above with respect to independent claim 1. Independent claim 11 sets forth "orienting the first jetting valve to provide a first jetting direction nonperpendicular to the first surface of the substrate" and "orienting the second jetting valve to provide a second jetting direction nonperpendicular to the first second of the substrate". Independent claim 14 recites "orienting the jetting direction oblique to the surface of the substrate". Independent claim 16 sets forth "pivoting the jetting valve to orient the jetting direction nonperpendicular to the surface of the substrate". Independent claim 19 recites "pivoting the nozzle to orient the jetting direction of the material flow nonperpendicular to the substrate". Therefore, Applicants request that the rejection of claims 11-12, 14-17, 19, 20, and 24-26 be withdrawn for one or more of the reasons discussed above.

Response to Examiner's Arguments in the Advisory Action

On page 2 of the Advisory Action, the Examiner states that "fig. 2 [of Mathias] clearly shows continues stream of the liquid form the nozzle and then becomes atomized (droplets) away from the nozzle opening." Applicants note that the amendment to the independent claims 1, 11,

14, 16, and 19 now sets forth a droplet of the viscous material jetted "out of" the dispensing orifice in the jetting direction. Applicants disagree with the Examiner's statement as the droplets in Mathias are not formed until after the viscous material is jetted from the dispensing orifice. Specifically, the viscous material emitted from the dispensing orifice 7 in Mathias as a continuous stream, travels for a short distance as a continuous stream after leaving the dispensing orifice 7, and is atomized by the air streams from the atomizing holes 6 after traveling this short distance. The viscous material in Mathias is not discharged from the dispensing orifice 7 as droplets, as set forth in the independent claims 1, 11, 14, 16, and 19.

Conclusion

Applicants have made a bona fide effort to respond to each and every requirement set forth in the Office Action. In view of the foregoing remarks, this application is submitted to be in complete condition for allowance. Accordingly, a timely notice of allowance to this effect is earnestly solicited. In the event that any issues remain outstanding, the Examiner is invited to contact the undersigned to expedite issuance of this application.

Applicants do not believe any fees are due in connection with filing this communication. If, however, any additional fees are necessary as a result of this communication, the Commissioner is hereby authorized to charge any under-payment or fees associated with this communication or credit any over-payment to Deposit Account No. 23-3000.

Respectfully submitted,

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